



INNOVATION OF NEW ENGINEERING TEACHING MODEL OF WORLD-CLASS UNIVERSITIES

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ABSTRACT

The fourth industrial revolution, characterized by intelligence and informationization, has brought profound changes to mankind, and at the same time, higher requirements for the quality of personnel training has been put forward. As the main form of higher education, undergraduate education is the backbone of cultivating innovative talents. There has been a certain development in the situation of talents training in China in recent years, but it is still many problems. The quality of engineering talents cannot meet the needs of social and economic development. Therefore, reform research on the current engineering undergraduate teaching mode need to be carried out. In this paper, taking Zhengzhou University as an example, the present situation and problems of engineering teaching mode were analyzed, a new teaching mode of engineering education was constructed, and practical exploration was carried out.

KEY WORDS: New engineering, World-class University, Teaching mode, Innovation.

1. INTRODUCTION:

With the rapid application of cloud computation, internet, big data, artificial intelligence and so on, the transformation of industrial field has been promoted. The era of knowledge economy calls for creative talents, therefore new requirements for school education have been put forward. As an important part of higher education, it is also necessary to conform to the trend of the times and seize the opportunities of new industry development and new technology innovation. So the reform of the teaching mode of new engineering in world-class universities was put forward.

2. CURRENT DEVELOPMENT SITUATION AND PROBLEMS OF ENGINEERING TEACHING MODEL IN WORLD-CLASS UNIVERSITIES:

2.1 Current situation of engineering teaching model in world-class universities:

- 1) **Continuous expansion of the scale in higher engineering education:** In 1978, there were 184 technical colleges and universities in China, and 2188 engineering specialty specialties. By 2018, the total scale of all kinds of higher education in China has reached 38.33 million people, and the gross enrollment rate has reached 48.1%. Our higher education has changed from elite education to popular education, and has built the largest higher education system in the world. There are 2663 general colleges and universities (265 independent colleges), 1245 undergraduate colleges and universities, 1418 higher vocational colleges and 815 post-graduate training institutions. At present, 1047 of China's undergraduate universities offer engineering majors, accounting for 91.5% of the total. A total of 14,085 undergraduate engineering majors are offered in universities, accounting for 32% of all undergraduate majors in China. The number of undergraduate students in higher engineering education reached 4.523 million, accounting for 32% of the undergraduate students above the university level. At present, the training scale of engineering education in China ranks the top in the world.
- 2) **Continuous improvement of teaching conditions in higher engineering education:** Since the 1990s, universities in our country have been expanding their own campuses, greatly increasing the area of land, and many cities have even established university towns or university parks. In recent years, the educational facilities of major universities, such as laboratories, practice bases, books and materials, network construction, have been significantly improved. Engineering colleges and universities have established their own internal and external engineering education platforms, which can basically meet the needs of training engineering talents.
- 3) **Continuous improvement of educational level in higher engineering education:** Through the implementation of "211 Project", "985 Project" and "Quality Engineering", school conditions, key subjects, science and technology innovation platforms and innovation teams were constructed, which has effectively promoted the training of high-quality engineering talents in China. Now, our country has established educational cooperation and exchange relations with 178 countries and regions in the world and international organizations, and 32 countries and regions have carried out mutual recognition of academic qualifications with our country. This reflects the higher level of higher education in China. The "Quality Engineering" implemented by the China's Min-

istry of Finance and the Ministry of Education provides the most powerful guarantee for the quality of higher engineering education in China.

2.2 Problems existing in engineering teaching model in colleges and universities:

In 1999, the enrollment of higher education in China began to expand greatly, and then the gross enrollment rate of higher education and the number of college graduates increased year by year. Market demand for talent has also changed. First of all, after the enrollment expansion of higher education, the teacher ratio is insufficient, which has a great impact on the quality of teaching. Secondly, due to the expansion of enrollment, teaching funds, infrastructure, school buildings, experimental sites, instruments and so on cannot meet the normal teaching needs, which to some extent affects the quality of personnel training in colleges and universities. Thirdly, after the expansion of higher education enrollment, the quality of college students has declined relatively. The curriculum system of higher engineering education in our country is unreasonable, the structure of teaching staff is single, and the cooperation between industry and university is faced with many obstacles. For example, the curriculum system needs to be improved, the traditional teaching mode is still emphasized on, the teaching staff needs to be optimized, and the cooperative innovation mechanism of "industrial, academic and research" needs to be improved urgently.

In short, at present, the teaching methods of higher engineering education in our country are mainly classroom indoctrination, the form is rigid and single, and the training of engineering practice is seriously inadequate, which results in the training of Engineering students weak experimental ability, lack of innovation consciousness and innovation ability, and so on. Some universities attach more importance to scientific research than to teaching, to intelligence quotient (IQ) than to emotional quotient (EQ), to knowledge imparting than to ability training, and to the results of an exam than to the ordinary tests. Even some colleges and universities do not have mid-term examinations, neglect guidance and incentives in ordinary time. Some students usually take less time in learning, low EQ, fear of hardship, despise life, lack of teamwork spirit, unreasonable knowledge structure and poor expression ability in the project group.

3. PRACTICE AND EXPLORATION OF NEW ENGINEERING TEACHING MODE IN WORLD-CLASS UNIVERSITIES:

The fourth industrial revolution, characterized by intelligence and informationization, has brought profound changes to human beings and higher requirements on the quality of personnel training was put forward. According to the future development needs, Zhengzhou University learns from the experience of top universities in the world and puts forward the plan of new undergraduate course "solid foundation, continuous innovation, pursuit of excellence" in order to build a world-class university, and the education training mode of new engineering of world-class university was explored.

3.1 Create a high-quality curriculum system and improve the quality of education:

- 1) Promote curriculum reform: focus on curriculum construction of world-class and construct Golden Course of Zhengzhou University.
- 2) Optimize the curriculum system: improve the general education curriculum system, strengthen the construction of double-innovation course.

- 3) Strengthen international exchanges: strengthen the employment of overseas teachers, deepen foreign english teaching, and implement professional teaching by foreign teachers.
- 4) Build wisdom education: set up online classes, build wisdom classroom and upgrade information management system.

3.2 Deepen curriculum teaching reform and improve teaching effect:

- 1) Curriculum teaching reform: small-class teaching, deliberative teaching, interactive teaching, case teaching and mixed golden course teaching.
- 2) Construction of course resources: build high-quality courses, introduce high-quality moocs, and build network platform.

3.3 Promote the reform of assessment methods and strengthen process inspection:

- 1) Implement multiple assessment: increase the proportion of interview and experiment, strengthen the intensity of process evaluation, and expand the proportion of formative evaluation.
- 2) Strengthen the separation of teaching from examination: strengthen the construction of examination database, and encourage non-standardized examinations.
- 3) Strict examination management: cancel the cleaning examination of graduation, reasonably increase the difficulty of examination, and strengthen the supervision of graduation thesis.

3.4 Carry out the cultivation of outstanding talents to promote the students' abilities:

The idea of the training outstanding talents is to attach equal importance to IQ and EQ, to combine ability and knowledge, and to emphasize EQ education. Our school has established an evaluation and training model covering the whole process of enrollment, training, employment and lifelong development. For example, reform the enrollment system and attract world-class students. When new students receive the admission notice, they will be informed of the training goals and standards of the university, and what should be done and should not be done. After entering the school, the school is gradually and continuously strengthening the professional guidance, so that the interest of the students in learning is continuously improved.

4. CONCLUSION:

Zhengzhou University will insist cultivating world-class talents, steadily promote world-class construction, follow the pace of education reform of world-class university, create the best undergraduate teaching mode in the world, and train the leading engineering personnel with innovation, creation and entrepreneurship spirit for our country.

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